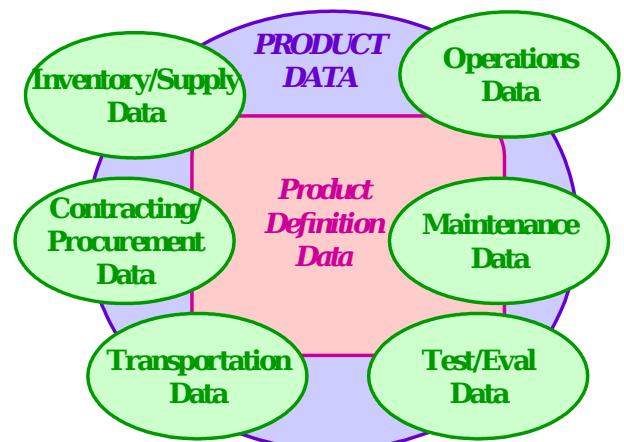

Electronic Navy Product Data Management (eNavyPDM)

Information Technology Architecture

30 October 2001

Product Data Definitions

- Product Data (PD) = **Product definition data + all other associated information need to acquire, manage, operate, sustain and dispose of a product**
- Product Definition Data (PDD) = **all data necessary to produce a qualified product**
- Product Data Management (PDM):
 - PDM products control (or at least warehouse) the technical drawings and documents created during the design phase, and manage the bill-of-material (BOM) databases that record the details about a product
 - Workflow elements control approval and collaborative product design and re-design



Source: META Group

Product Data Examples

- **Configuration information**
- **Engineering drawings**
- **Specifications and standards**
- **Part definitions and design data**
- **Documents, notes, correspondence, etc.**
- **Maintenance data**
- **Any information collected throughout a product's life cycle**

Navy Drawing Issues - the “SWAMP”

- **12 DON JEDMICS sites (8 NAVSEA)**
 - Many additional stovepipe repositories
- **67% of Drawings on aperture cards**
 - 81,143,332 images
 - 26,817,678 Digital (33%)
 - 54,325,654 Aperture Card (67%)
- **% unmarked unknown**
 - not authorized for transmission over web
- **Ownership Unknown - No link to “authoritative” data source**
- **Expensive Operations to Maintain**
- **No life cycle visibility of drawings**
- **No standard format, no standard expected**

JEDMICS/Drawing Opportunities

- **Eliminate all duplicates; link to “original” images from “official” repository**
- **Evolve within a “Navy/DOD” data architecture**
- **Assist in resolution of Challenges:**
 - Eliminate redundant & unnecessary repositories
 - Identify and designate drawing “owners”
 - Allow for storage in native format

eNavyPDM can play a key role in addressing Navy's Engineering Drawing Challenges

Navy Data Ownership

- **Data ownership up for debate**
- **DOD 5000:**
 - Program Managers responsible for data management throughout the product life cycle
- **Many PMs delegate to ISEAs**
 - No electronic link to Program Managers
 - Many Programs no longer exist
- **NAVAIR, NAVSEA, PMs pursuing unique solutions**

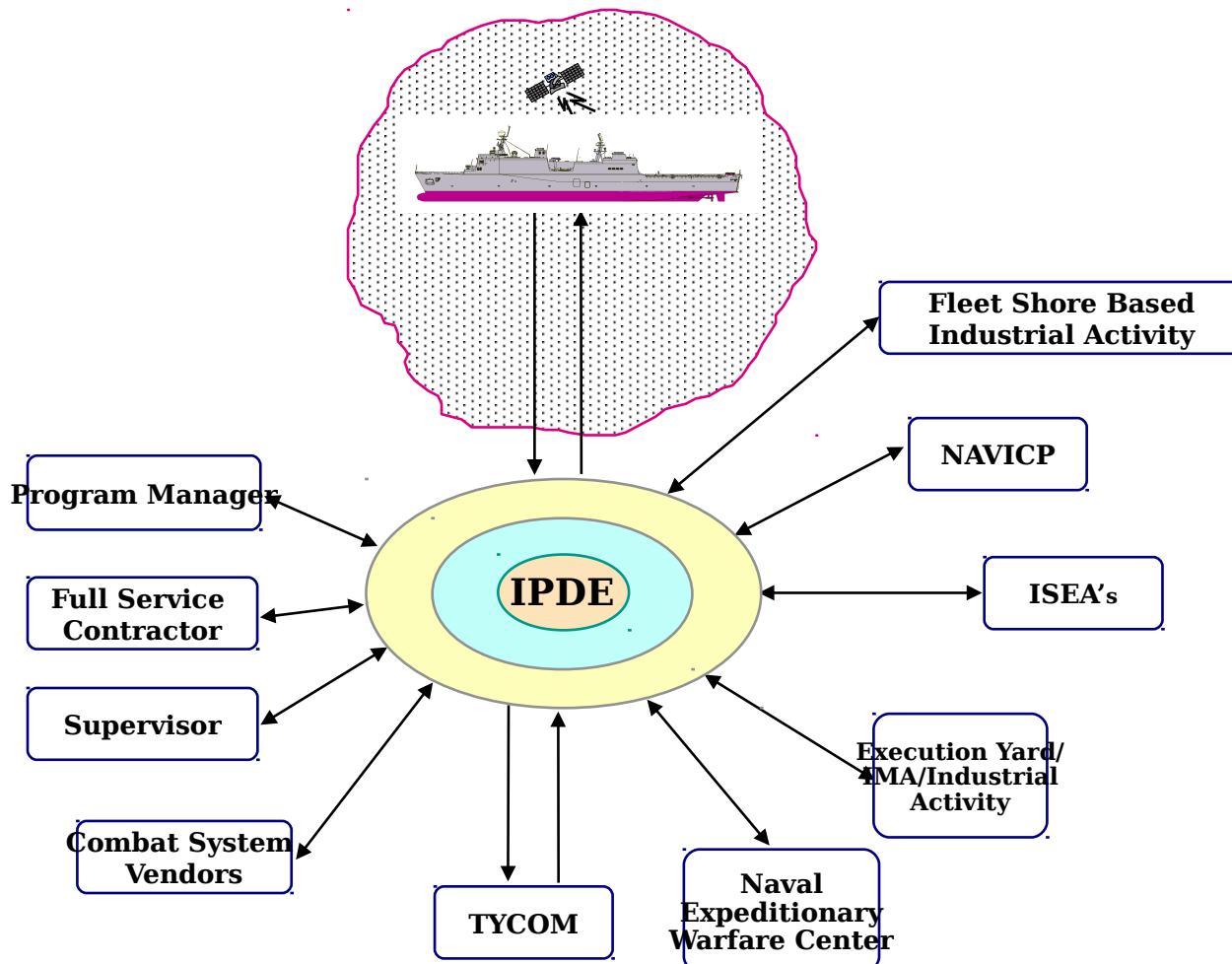
Proposed “Product Data Vision”

- **“A single request for any product data, from anywhere in the world, will provide the data, from the authoritative data base, in the appropriate format, with electronic links to additional product data.”**

LPD-17 IPDE Approach

- **Capture the data in a single repository**
- **Manage the configuration and change via 3D product model description**
- **Integrate design, production, and life cycle support data**
- **Maintain repository throughout life cycle**
- **Provide access to both industry and Navy**

Life Cycle IPDE Vision



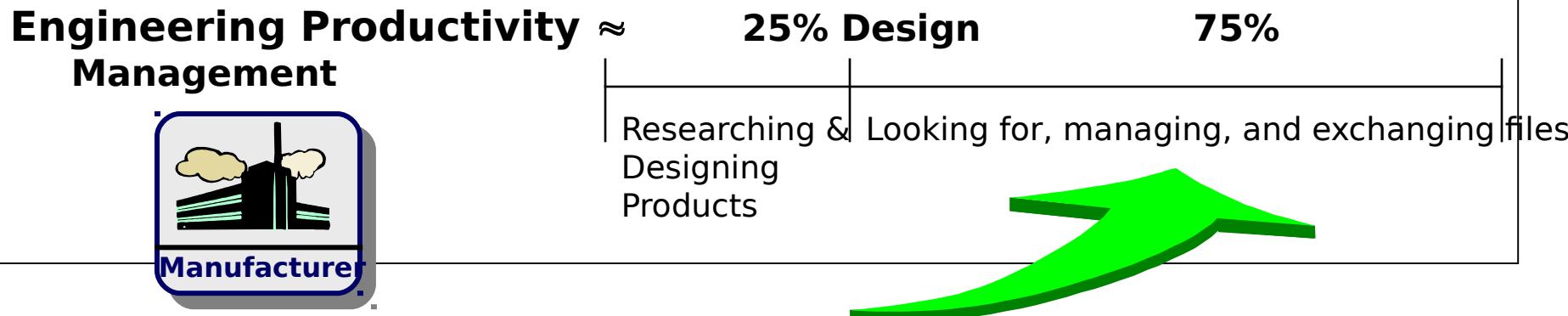
IPDE Benefits to Life Cycle Support

- **Single source for design, construction and life cycle engineering and support data for the LPD 17 Class**
- **Changes within the product model subject to change management process**
- **All product model data, both ashore and at sea, maintained under configuration control processes**
- **Interfaces and integration with Navy legacy systems and infrastructures will be through the IPDE**

PDM systems also...

- **manage product development process and data**
- **control product information, states, approval processes, authorizations and other activities that impact on product data**
- **provide data management and security**
- **ensure users always get and share the most recent, approved information**
- **distribute and control access to product information**

Industry Business Case



- Data must be shared throughout the entire product life cycle
- Design engineers, product users and “sustainers” should integrate processes and data

Objective: Increase productivity by reducing the time and effort required to find, manage, and exchange product information

Concerns

- **Redundant efforts in work that must be consolidated or integrated relative to Navy's Product Data**
 - Four Navy ERP implementations
 - NAVSEA Data Environment (NDE)
 - JATDI
 - Program Manager IDEs (LPD-17 IPDE, JSF, etc.)
 - VSIP
 - DII efforts
 - Others TBD

Goal: Ensure all efforts work together to achieve Navy's "Product Data Vision"

What Do We Want To Fix?

- **Business processes and data are not well integrated**
 - Large number of processes involve multiple organizations, systems, and data (heterogeneous environment)
 - ERP will integrate a lot, but gaps will exist for some time
- **Authoritative Data Sources not easily “findable”**
 - Cannot always identify and share complete configurations of items on board ships for decision making
 - Multiple sources for the same data can cause configuration data problems
- **Unclear roles of data managers/users & data owners**
 - Who updates/uses data often conflicts with who actually owns data (records, files)
- **Same data stored too many times**
 - Don't want unneeded, costly data redundancy/duplication

What Do We Want To Do?

- **Provide enterprise stakeholders with virtual access across enterprise of data and information assets**
 - Based on business processes and business rules
- **Apply best of breed technologies to create an authoritative top-down break down structure for Navy weapon systems**
 - Define authoritative systems and eliminate unneeded data redundancy
 - Create comprehensive weapon system master product indexes of approved configuration
 - Weapon system information definition: configuration data, tech manuals, PMS, serial number tracking, 3M, drawings in any format
- **Integrate ERP's current configurations with approved configurations of master product indexes**
 - Minimize need for rehosting data
- **Reduce software development and implementation time and cost**
 - Use open, accessible, common web-based tools (e.g., XML, UML)

What Is eNavyPDM Approach? (1 of 2)

- **Develop Interoperability Strategy**
 - Establish Enterprise Integration Roundtable
- **Define eNavyPDM detailed requirements**
 - Conduct Gap Analysis of related WEN and ERP efforts
 - Ensure no overlaps
 - Select candidate weapon system for prototype
 - Conduct working groups of SMEs to identify processes and authoritative data sources
 - Document requirements and concept of operations
- **Conduct market survey to determine best technology(ies) to meet requirement**
 - Procure best fit commercially available tool(s)

What Is eNavyPDM Approach? (2 of 2)

- **Build the process model**
 - Use standard workflow tools
 - Define business rules for information exchanges
- **Build weapon system master product indexes**
 - Support defined business processes
 - Integrate authoritative data sources
- **Integrate process model and master product indexes with ERP, for example:**
 - Weapon system configuration management
 - Equipment maintenance and planning
 - Inventory management
- **Prove it works in a demonstration**

Key Enablers

- **Navy Enterprise Integration Roundtable**
 - Senior leader sponsorship and guidance
 - Ensure meeting warfighter needs
- **Establish enterprise integration “Big Picture”**
 - Enterprise integration Concept of Operations: includes ERP, WEN (which includes eNavyPDM), others
 - Specifies weapon system and functional relationships
- **Empowered, motivated subject matter experts**
- **Application of open, accessible web-based tools**
 - Standards, standards, standards...
 - XML for data exchange formats and mappings
 - UML for business process management

Leverage Ongoing Efforts

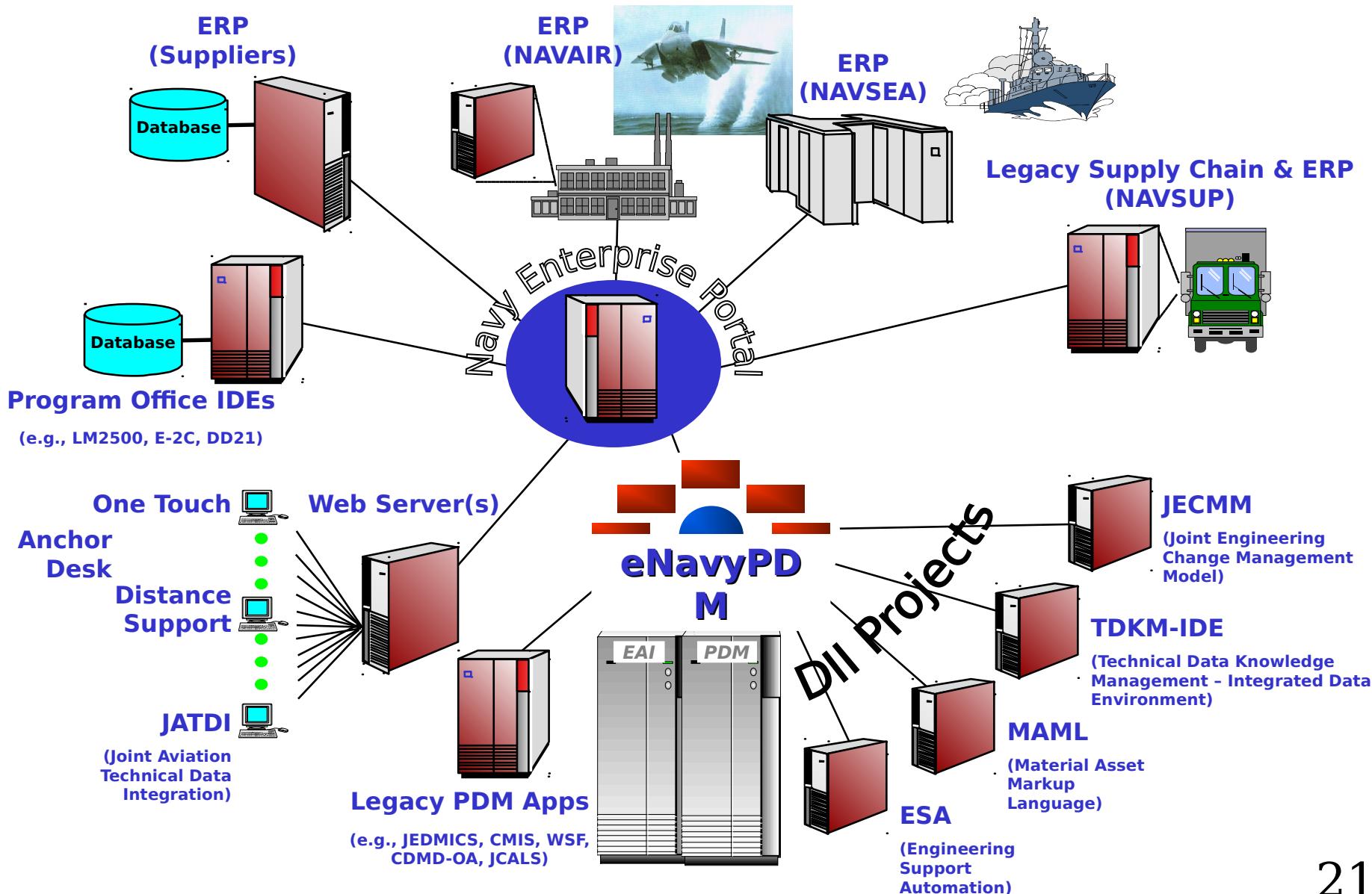
- **Navy Enterprise Portal**
- **JATDI**
- **DII Projects**
 - TDKM-IDE: technical data repository
 - MAML: XML development methodologies
 - JECMM: Web-based application integration
 - PRIDE: technical data access/integration
 - Others ...
- **JCALS**
- **NMCI**
- **EXOSTAR industry trading portal**

Where Is eNavyPDM Going?

- **Provide value-added master product indexes**
 - Comprehensive top-down breakdown of weapon systems
 - “Horizontal” views across weapon systems
 - Identification and management of common parts
 - Different functional views of **SAME INFORMATION**
- **Integrated business processes**
 - Build on ERP’s transaction backbone
 - Integrate between ERP implementations and fill any “gaps”
 - Integrate legacy applications and data based on processes
- **Build on Navy Enterprise Portal for common IT services**
 - Single logon, directory services, etc.

eNavyPDM

Application Integration & PDM “Glue” the Navy Enterprise

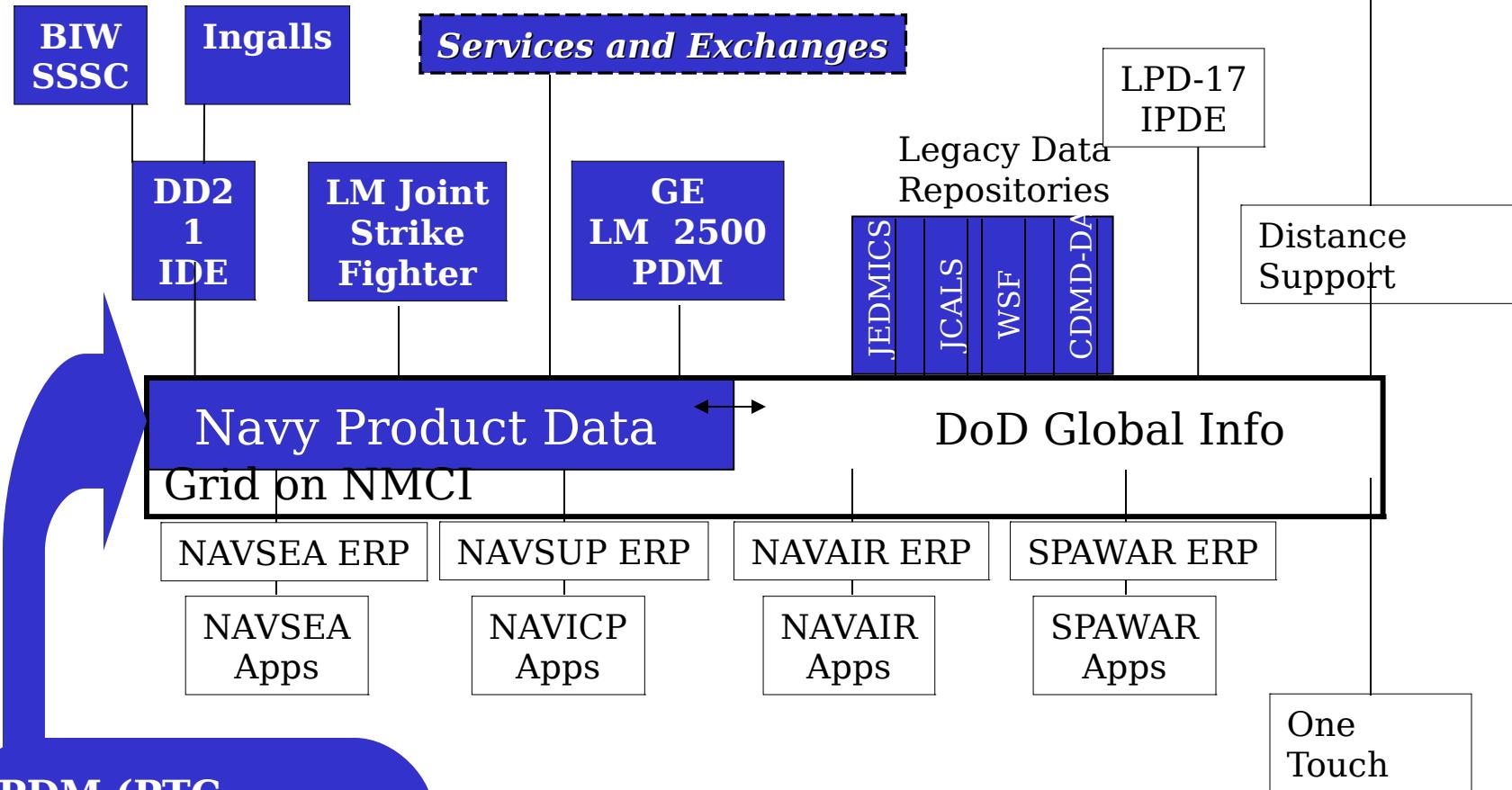


Backups

NAVY Critical Product Data

- **Configuration Data**
 - CDMD-OA (SEA)
 - Weapons System File (WSF)
 - Material Requirements Planning (MRP)
 - Naval Aviation Logistics Management Information System (NALCOMIS)
- **Engineering Drawings**
 - Joint Engineering Drawing Management Information Control System (JEDMICS)
- **Technical Manuals**
 - Joint Computer Aided Logistics Systems (JCALS)

Proposed Solution



PDM (PTC - Windchill)

- Engineering Drawings
- Technical Manuals
- Configuration Control

• Product Master Index

- Relate data/documents to weapon system structure to find data easier
- Easily update current CM info

• Data Vault & Document Mgmt

- Store and manage any document format
- Check-in and check-out control

• Project Management

- Collaboration tools

• Workflow

- Manage business processes

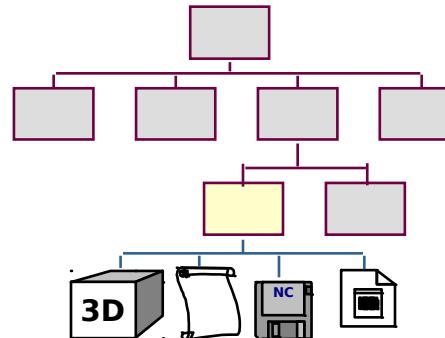
• Part & Component Management

- Uniform classifications for common parts (Horizontal view)

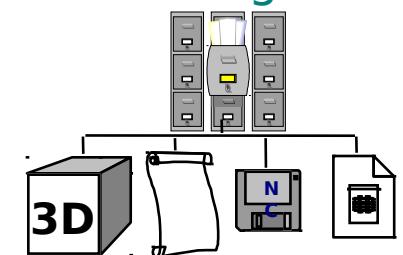
• User Experience

- Concurrent use of data & documents
- Web access & security mechanisms

Product Structure Management



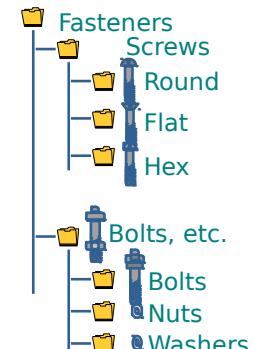
Data Vault & Document Management



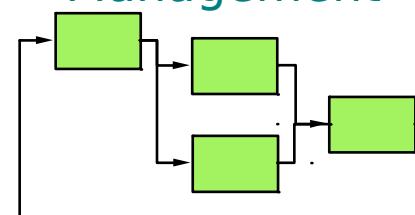
Program&Project Management



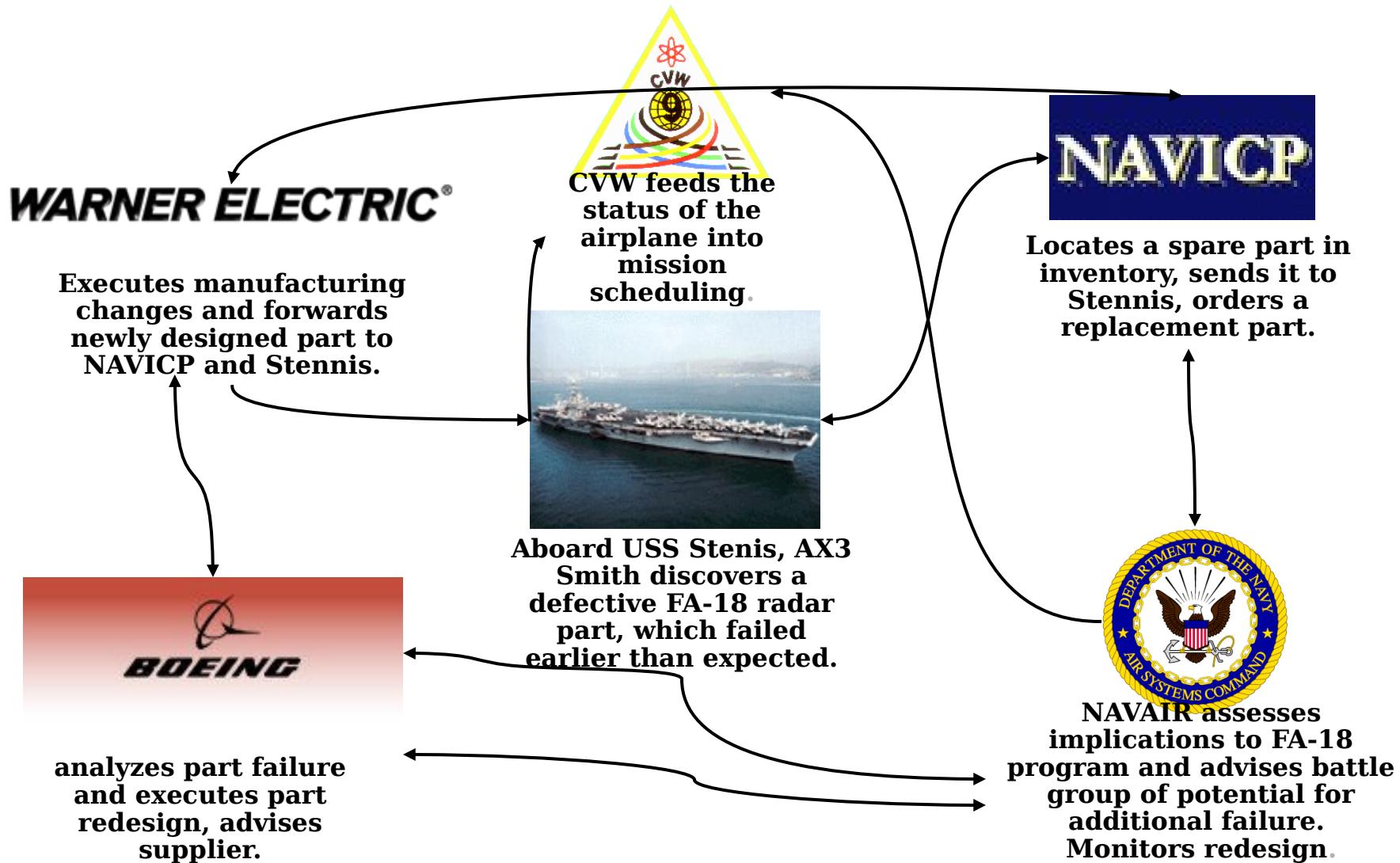
Part & Component Management



Workflow & Process Management



eNavyPDM Notional Example



Additional Goals

- **Eliminate all duplicates; link to “original” data from “official” repository**
- **Evolve within a “Navy/DOD” data architecture**
- **Assist in resolution of Challenges:**
 - Identify and designate data “owners”
 - Clarify “Navy Product Data Vision” and required IT architecture
 - Assist in obtaining required resources